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The first of these stars has the largest constant radial velocity hitherto observed. Some years ago the star Lalande 1966 was found to have the velocity  $-325$  km. Its spectrum is also of the F type.

Both stars appear in van Maanen's list of stars with large proper motions.

W. S. ADAMS,  
A. H. JOY.

#### FIVE NEW VARIABLE STARS IN GLOBULAR CLUSTERS.

The following variable stars have been found on photographs of clusters made with the 60-inch reflector by Mr. Shapley. The distances from the center of the clusters are approximate, but are probably sufficient for identification, altho three of the variables have neighboring stars with which they might be confused. Southwest of the variable in N. G. C. 4147 are two bright stars, the nearer of which is  $3''$  south and  $3''$  west. A bright companion to the variable star in N. G. C. 6229 is east  $11''$  and north  $3''$ . A faint triplet near the second variable in N. G. C. 6981 is north  $3''$  and west  $9''$ .

Cluster	Designation of Variable	Position		Photographic Magnitude	
		$\Delta\alpha$	$\Delta\delta$	Bright	Faint
N.G.C. 4147	1	+ $1''$	+ $18''$	16.5	17.1
6229	1	- 5	- 38	15.4	15.8
6712	1	- 67	- 8	15.9	16.7
6981	1	- 42	- 55	16.3	17.3
	2	- 18	- 38	15.6	16.4

There is only one other star in N. G. C. 6229 brighter than the variable when it is near maximum. The other four variables range from the tenth to the thirty-fifth brightest in their respective systems. No other variables have been recorded in these clusters.

HELEN DAVIS.

#### THE PARALLAX OF THE RING NEBULA IN LYRA.

A study of the parallax of the ring nebula in *Lyra* has just been completed by the measurement and reduction of a long series of Crossley plates.<sup>1</sup> The result is a parallax of  $0''.015$ , and there are certain indications that even this very small value is probably

<sup>1</sup>Published in *Lick Observatory Bulletin* No. 299, October 16, 1917.

larger than the actual parallax of the nebula.<sup>2</sup> The value obtained for proper motion is less than one second of arc per century.

Figured on the basis of a parallax of  $0''.015$  the distance of the ring nebula from the solar system would be 220 light years. The longer diameter of the ring or oval is about one minute of arc. The corresponding actual diameter would be two thousand times the diameter of the Earth's orbit or a little less than seventy times the diameter of the orbit of *Neptune*. Light traveling at the rate of 186,000 miles per second would require a period of twenty-three days to traverse the nebula from one extremity of the ring to the other.

These figures are based on a parallax of  $0''.015$ , but if the parallax is actually smaller than this the distance of the nebula from the solar system and the dimensions of the nebula are greater still, in inverse proportion to the value of the parallax. Future observations may show this to be the case. It is almost certain however that the parallax is very small and consequently that the ring nebula is remote and very large as compared, say, with the solar system.

BURT L. NEWKIRK.

#### EPHEMERIS OF JUPITER'S NINTH SATELLITE.

<i>Greenwich Noon</i>		SATELLITE — JUPITER		<i>Magnitude</i>
		<i>R. A.</i>	<i>Dec.</i>	
1917	Nov. 9	— 6 <sup>m</sup> 41 <sup>s</sup>	— 40'.9	18.6
	17	— 6 54	— 38.1	
	25	— 7 3	— 34.9	18.5
	Dec. 3	— 7 8	— 31.3	
	11	— 7 9	— 27.2	18.5
	19	— 7 5	— 22.8	
	27	— 6 57	— 18.1	18.5
1918	Jan. 4	— 6 45	— 13.2	
	12	— 6 28	— 8.1	18.6
	20	— 6 8	— 3.1	
	28	— 5 43	+ 1.8	18.7

A photograph of the satellite was made by Mr. Shapley with the 60-inch reflector on November 10th. The corrections to the ephemeris on that date were +0'.4 in *R. A.* and -0'.1 in *Dec.* The magnitudes given above are photographic and have been computed using 18.6 as the magnitude at mean opposition.

SETH B. NICHOLSON.

<sup>2</sup>See, in this connection, van Maanen's note in the October number of these *Publications*.